

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 71493-1289	FOR FURTHER ACTION see Form PCT/ISA/220 as well as, where applicable, item 5 below.	
International application No. PCT/CA2004/000980	International filing date (day/month/year) 07/07/2004	(Earliest) Priority Date (day/month/year) 07/07/2003
Applicant NORTEL NETWORKS LIMITED		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 5 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ The international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

b. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.

2. ☐ **Certain claims were found unsearchable** (See Box II).

3. ☐ **Unity of invention is lacking** (see Box III).

4. With regard to the **title**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

☐ the text is approved as submitted by the applicant.

☒ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. With regards to the **drawings**,

a. the figure of the **drawings** to be published with the abstract is Figure No. 4a

☒ as suggested by the applicant.

☐ as selected by this Authority, because the applicant failed to suggest a figure.

☐ as selected by this Authority, because this figure better characterizes the invention.

b. ☐ none of the figures is to be published with the abstract.

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International application No.

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Box No. IV Text of the abstract (Continuation of item 5 of the first sheet)

A system for doing BLAST with, fewer receive antennas or even only one receiving antenna is, provided. A system implementation architecture is provided together with a detailed analysis on its principle and theory behind this engineering solution to reduce the MIMO technology cost by using fewer antennas whilst achieving high spectrum efficiency. Examples are provided on how to implement this idea in a CDMA platform and in a OFDM platform. A transmitter comprises: N transmit antennas, where $N \geq 2$; wherein the transmitter is adapted to transmit a respective one of N transmit signals from each of the N antennas, the N transmit signals collectively containing a plurality N of main signals and plurality of delayed main signals each delayed main signal being a delayed version of one of the main signals, wherein each transmit signal comprises a combination of a respective main signal of the plurality of main signals and at least one respective delayed main signal of the N delayed main signals.

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A. CLASSIFICATION OF SUBJECT MATTER
 IPC 7 H04B7/06 H04L1/06

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H04B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 430 231 B1 (CALDERBANK ARTHUR R ET AL) 6 August 2002 (2002-08-06) column 3, line 24 - line 46; figure 1 -----	1-49
X	US 6 178 333 B1 (FEUERSTEIN MARTIN J ET AL) 23 January 2001 (2001-01-23) column 2, line 43 - column 3, line 14 column 7, line 1 - line 41; figures 4,6,9 column 13, line 3 - line 27; figure 11 -----	1-49
A	US 6 356 528 B1 (LUNDBY STEIN S ET AL) 12 March 2002 (2002-03-12) column 5, line 54 - column 6, line 11; figures 2,3 column 7, line 27 - line 45 ----- -/--	1-49

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

20 October 2004

Date of mailing of the international search report

26/10/2004

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INTERNATIONAL SEARCH REPORT

International Application No

PCT/CA2004/000980

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 1 185 001 A (NORTEL NETWORKS LTD) 6 March 2002 (2002-03-06) paragraphs '0018! - '0022!; figures 1,5,7,8 -----	1-49
A	EP 0 969 610 A (LUCENT TECHNOLOGIES INC) 5 January 2000 (2000-01-05) paragraphs '0003!, '0004! paragraph '0012!; figure 1A -----	1-49
A	EP 0 771 084 A (NIPPON ELECTRIC CO) 2 May 1997 (1997-05-02) page 8, line 19 - line 34; figures 6a,6b -----	1-49

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/CA2004/000980

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